

## REMARKS

**Amendment:** This is the filing of an amendment under 37  
CFR 1.111 responsive to the office action dated June 13,  
5 2005.

### **Claims:**

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With regard to the claims objections of claims 9-11 for  
lack of antecedent basis for "sensing unit", applicant has  
amended these claims to make them dependant on claim 8.

With regard to the objection of claim 18 for lack of  
15 antecedent basis for "fiber", applicant has amended this  
claim to properly reference the antecedent "waveguide".

With regard to the 35 USC 102 rejection of claim 1 over  
Cai, applicant has amended this claim to recite a WGM cavity  
comprising a planar disk having a top cladding ring, a  
20 cavity ring, and a bottom cladding ring. Applicant notes  
that the resonator is shown and described a sphere 101 of  
Cai figure 1 and 320 of figure 3, rather than a planar ring  
of the present invention. Applicant also notes that while  
the sphere 320 of Cai is coupled to fiber 310, there is not  
25 a planar surface present in the structure, as recited in the  
amended claim 1. Additionally, applicant notes that the

Amendment filed under 37 CFR 1.111

resonator of Cai is spherical as this results in an available optical path which is an integral number of wavelengths for a wide range of input wavelengths, which is important because the device of Cai supports two widely  
5 separated wavelengths (paragraph 15), although at the expense of efficiency of coupling (i.e. some modes are circulating perpendicular to the optical coupler), whereas the planar resonator of claim 1 has improved efficiency of coupling by virtue of having the supported optical waves  
10 axially oriented in the same direction as the coupling structures.

With regard to the 35 USC 102 rejection of claim 2 over Cai, applicant has amended claim 1 in allowable form, and notes that Cai teaches neither a planar resonator ring nor a  
15 planar resonator coupled to a planar surface.

With regard to the 35 USC 102 rejection of claim 3 over Cai, applicant notes that the prior art ring laser referenced in Cai paragraph 22 page 3 is a prior art optical source belonging to the class of laser sources, and is  
20 neither the resonator 102 or 320 of Cai, nor a whispering gallery mode coupling structure of the present invention.

With regard to the 35 USC 102 rejection of claim 6 over Cai, applicant notes that the amended claim 1 recites a planar WGM resonator not found in Cai, and the dump  
25 waveguide 2310 of applicant figure 23 is coupled to the edge perpendicular to the planar surface. Cai does not disclose

a dump waveguide. Structurally, the dump waveguide, or output waveguide 2310, of the present application contains only optical energy which had been circulating in and coupled out of the WGM resonator, while the output waveguide of Cai principally contains the input optical energy, due to the weak coupling to the WGM sphere (see figure 5 of Cai). Since amended claim 1 is allowable, and dependant claim 6 recites a structure not found in Cai, claim 6 is allowable. Reconsideration is requested.

With regard to the 35 USC 102 rejection of claim 7 over Cai, applicant notes that the dump waveguide of Cai is integral with the feed waveguide, whereas the dump waveguide of claim 7 is a separate structure coupled exclusively to the resonator. Furthermore, the direction of offset in the amended claim 7 of the present invention is perpendicular to the direction of offset in Cai. Reconsideration is requested.

With regard to the 35 USC 102 rejection of claim 12 over Tapalian, applicant has amended claim 12 with the limitation of a planar resonator comprising a resonator ring and outer cladding rings, where the resonator couples optical energy across the planar surface. Applicant notes that Tapalian couples optical energy from a rectangular waveguide into the outer surface of a spherical resonator centered over the waveguide in figure 1B, whereas the amended claim 1 of the present invention couples optical

energy from a rectangular waveguide to a planar disk comprising a cavity disk surrounded by cladding disks. The spherical resonator of Tapalian achieves guiding of waves through a doping of the outer surface, while the resonator of the present invention comprises a resonator ring surrounded by cladding rings. The resonator of Tapalian changes index of refraction in response to the outer surface being exposed to the vapor to be measured, while the operative surface of the present invention is a rectangular toroid of exposed waveguide material at the edge of the resonator of the disk. Furthermore, the spherical resonator of Tapalian supports waves traveling in any direction on the surface of the resonator, while the resonator of the present invention preferentially supports waves traveling in the same direction as the input or output (dump) waveguide. Reconsideration is requested.

With regard to the 35 USC 102 rejection of claim 13 over Tapalian, applicant notes the multiple resonators of Tapalian are spherical resonators which do not contain the planar resonator structure of the present invention, and do not have the planar coupling surface of the amended claim 13.

With regard to the 35 USC 102 rejection of claim 14 over Tapalian, applicant notes that Tapalian contains no teaching of one resonator directly coupling optical energy from one resonator to another as in the amended claim.

Amendment filed under 37 CFR 1.111

With regard to the 35 USC 102 rejection of claim 15 over Tapalian, applicant notes that the close proximity of Tapalian is between the resonators and the waveguide, while the close proximity of the present invention figure 24 and claim 15 is from one resonator to another. Reconsideration is requested.

With regard to the 35 USC 102 rejection of claim 16 over Tapalian, applicant notes that the claims of the present invention distinguish between coupling from a waveguide to a resonator, and coupling from a resonator to a resonator. There is no teaching of resonator to resonator coupling in Tapalian. The two rows of resonators of Tapalian figure 5 do not "directly couple" because they do not couple at all, as the third and fourth resonators are coupled to entirely different waveguides. Note that Tapalian spheres of figure 5 on different rows cannot couple to two different waveguides if they are different sizes (col 7 line 23). The present claim 16 makes reference to only one waveguide. Reconsideration is requested.

With regard to the 35 USC 102 rejection of claim 17 over Tapalian, applicant notes that the plurality of resonator structures of claim 17 (from claim 13) are a different structure and arrangement from Tapalian. The spherical structures of figure 5 of Tapalian require different pedestal heights to accommodate the differences in spherical radius to achieve coupling to the waveguide, while

a variation in the inner radius and outer radius of the resonator of the present invention has no effect on any underlying structure. Additionally, the resonators of Tapalian do not have a planar surface or a planar coupling.

5 Reconsideration is requested.

With regard to the 35 USC 102 rejection of claim 18 over Tapalian, applicant notes that the underlying claim 12 has been amended to limit the resonator to a ring resonator which is distinct from Tapalian.

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With regard to the 35 USC 103 rejection of claim 4 over Cai in view of Tapalian, the amended claim 1 & 4 of the present application describe a planar resonator having a resonator ring surrounded by cladding rings, whereas the  
15 resonator of Cai and Tapalian are spherical without a planar surface. Furthermore, the amended claim 4 of the present invention claims a ring resonator defined by an inner radius and an outer radius in a planar structure, whereas the spherical resonator of neither Cai or Tapalian have these  
20 features. Therefore, claims 1 and 4 of the present invention are distinct from Cai and Tapalian. Furthermore, Cai and Tapalian are silent on the matter of planar ring resonators as described in the present application. The reference to a prior art ring laser in Cai paragraph 22 is  
25 to be understood as a prior art optical source for

generation of narrowband optical energy for use in a resonator.

With regard to the 35 USC 103 rejection of claim 5 over Cai in view of Tapalian, applicant notes that both Cai and Tapalian describe a spherical resonator, and Tapalian describes a plurality of spherical resonators, while the resonator of amended claim 5 is a plurality of planar resonators having the specific structure of a cavity ring enclosed by cladding rings, structure which is found in neither Cai nor Tapalian.

With regard to the 35 USC 103 rejection of claims 8 and 11 over Cai in view of Tapalian, applicant notes that the sensor of the present invention is a planar resonator comprising a cavity ring surrounded by planar cladding rings coupling through planar surfaces, structures not found or taught in Cai or Tapalian.

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With regard to the 35 USC 103 rejection of claims 21 & 24 over Cai in view of Tapalian, applicant has amended these claim 21 to include the planar resonator structure not found or taught in either Cai or Tapalian. Reconsideration is requested.

Amendment filed under 37 CFR 1.111

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With regard to the 35 USC 103 rejection of claim 9, 10, 22, and 23 over Cai in view of Tapalian and Anderson, applicant has amended independent claim 1 to describe a planar resonator. Applicant notes that while the resonators of Cai and Tapalian are spherical, the resonator of Anderson is cylindrical, rather than the ring structure of the present invention. Furthermore, the resonator of Anderson couples signal energy from the edge of the waveguide to the edge of the resonator (Anderson figs 3-5), while the resonator claims 9, 10, 22, and 23 of the present invention couple energy through the planar surface of the waveguide to the planar surface of the resonator. Reconsideration is requested.

With regard to the 35 USC 103 rejection of claim 19 over Tapalian in view of Dyott, applicant has amended the claim to include the limitation of a planar resonator. Tapalian is silent on a planar resonator, and Dyott does not describe resonators at all.

Allowable claim 20 has been amended to include the limitations of claim 19, as suggested by the examiner.



**Attorney of Record & new Assignee:** New assignee IFOS  
has included a PTO/SB/82 Revocation of previous power of  
attorney and appointment of the following practitioner as

5 Attorney of Record:

Jay Chesavage  
3833 Middlefield Rd.  
Palo Alto, Ca. 94303  
PTO Reg No 39,137

10 PTO Customer Number 24346.

The previous assignee, Oluma Inc., has transferred  
ownership of this case to new assignee IFOS (Intelligent  
Fiber Optic Systems, Inc). Attached please find an  
assignment statement under 37 CFR 3.73(b) and a copy of the  
15 assignment of this case from Oluma to IFOS.

With this amendment, the claims of the present amendment are  
allowable. Please direct all correspondence to the new

20 Attorney of Record:

Jay Chesavage  
3833 Middlefield Rd.  
Palo Alto, Ca. 94303

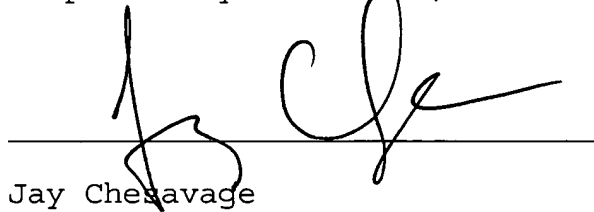
25 PTO Reg No 39,137

PTO Customer Number 24346.

Amendment filed under 37 CFR 1.111

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Respectfully Submitted,

A handwritten signature in black ink, appearing to read "Jay Chesavage", is written over a horizontal line. The signature is stylized with large, flowing letters.

Jay Chesavage

Registration No. 39,137

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